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March 24, 2017

Robert Mancini
Project Manager
Chevron Environmental Management Co.
1200 State Street
Perth Amboy, NJ 08861

Re: Chevron's Supplemental Ecological Report, November 1, 2016
Chevron USA, Inc.
Perth Amboy, Middlesex County, New Jersey
SRP PI# 003621

Dear Mr. Mancini:

The New Jersey Department of Environmental Protection (Department, NJDEP) has completed review of the above report, which was submitted pursuant to the Resource Conservation and Recovery Act (RCRA), Hazardous and Solid Waste Amendments (HSWA) Permit of 2013, and the Technical Requirements for Site Remediation at N.J.A.C. 7:26E (TRSR).

The referenced document was prepared TRC Environmental Corporation for Chevron Environmental Management Company (CEMC). The Department has reviewed the report in accordance with N.J.A.C 7:26E-1.16, 3.6, 4.8, and 5.1 (e), the *Ecological Evaluation Technical Guidance* (EETG), February 2015, and the *Ecological Risk Assessment Guidance for Superfund* (USEPA, 1997). The Department's comments on the above report are provided below.

Background Summary

The 368-acre former Chevron Facility is in Perth Amboy and Woodbridge Townships, and was divided into a series of five "yards," i.e., Central Yard, East Yard, North Field/Main Yard, West Yard, and Amboy Field. Environmentally sensitive natural resources (ESNRs) bounding the site are Woodbridge Creek, Spa Spring Creek, and the Arthur Kill. The former facility received heavy crude oil from tankers and refined it into asphalt cement and intermediate products. Contaminants of potential ecological concern (COPECs) include petroleum product, PAHs and metals.

Comments

1. General comment - The 2002 and 2014 data indicate that free and/or residual product is present in Woodbridge Creek sediment immediately adjacent to, or under influence of, the site over an approximately 1-mile stretch (SED 09 – SED 19) into deep subsurface sediment, as demonstrated by

highly elevated EPH and PAH concentrations (Figures 3 and 4) and information presented in the sediment core logs (Appendix B). In 2014, to comply with N.J.A.C.7:26E and to address prior Department comments, supplemental EPH data were collected in cores from some 2002 locations where EPH had not been analyzed, but where product impact was indicated. These 2014 supplemental cores have clearly indicated high EPH levels and visual/olfactory product indicators at depth. For example, in 2002, at location SED-03-C, total PAHs of approximately 100 mg/kg was measured, but was EPH was not analyzed. In 2014, 40,000 mg/kg EPH was identified at this location at 1.5 – 2', remaining elevated to depth of approximately 6'/refusal. Therefore, data gaps persist at the numerous 2002 locations lacking subsurface EPH data and boring log observations at depth, such as SED-06-A and C; SED-05 A, B, C; SED-04 A and B; SED-01-A, B, C; others. SED-19, the most downstream sample in Woodbridge Creek, is impacted with deep (6-8'), high levels of EPH. but without the subsurface data from SED-01-A, B, C, potential linkage to site cannot be determined. Additionally, it is the Department's opinion that data gaps exist and additional cores should be collected and analyzed for full scan contaminants and EPH where large distances (e.g., @ 1000') exist between transects (e.g., between transects 7 and 6; transects 3 and 2; transects 2 and 1).

In addition to data gaps addressed above, this report should be revised to address potential data gaps in Spa Spring Creek and the Arthur Kill. Only surface data (0 -0.5') from both waterbodies, and no EPH data from the Arthur Kill, are available. Based on findings of contamination at-depth in Woodbridge Creek, deeper cores should be analyzed to reduce uncertainty regarding subsurface contamination in these two water bodies. Additionally, in the Arthur Kill, potential contamination from operations at the docking berths (described on p. 4), such as from over-water fuel transfers from tankers, must be investigated as part of the RI (see comment 5).

2. (p. 9) *Technical Overview* – Text in the 3rd paragraph regarding sediment screening levels of 1700 mg/kg and 17,000 mg/kg for EPH must be corrected. 1700 mg/kg is a soil ecological screening criterion (ESC) based on earthworm reproduction and not applicable to sediment. 17,000 mg/kg describes the residual saturation point in soil and applies only to soil in non-environmentally sensitive natural resources (ESNRs, NJDEP 2010), therefore is also not applicable to sediment (in sediment, samples with concentrations much lower than 17,000 mg/kg EPH can exhibit multiple other indicators of free and residual product). Multiple lines of evidence should be used to identify, characterize, and delineate free and residual petroleum product. Visual and olfactory observations are paramount and considered definitive evidence of product. Chevron is referred to N.J.A.C.7:26E-2.1(a)14 and 2.1(d).

3. (p. 11) 4.1 Background *Sediment Investigations* – The text states that background sediment samples "were organized into four groups," however only data from upstream Spa Spring Creek and downstream Woodbridge Creek are addressed. - Please clarify this. The Department does not consider SED-09 or SED-19 from Woodbridge Creek to be background, due to a product "hot spots." As per the EETG, section 5.3.4, such grossly contaminated locations should not be used for background data. Additionally, SED-09 can be under site influence from tidal flow. The Spa Spring Creek data from SED-20 and 21, and SED-10 from Woodbridge Creek may be appropriate for use as background data, however, as per the EETG, section 5.3.4, subsurface intervals at depths that correspond to site-related sample depth intervals should be collected.

4. (p. 13) 4.3 Contaminants *of Potential Ecological Concern* – this section tabulates onsite soil concentrations within 200' of each of the surface water bodies and compares with sediment ESC. If soil remediation/removal has occurred on-site, please verify that these data are pre-remedial and represent data at all depths (i.e., worst-case), and explain whether more distal on-site soil data would be

important to consider, such as erosional soil near a discharge pipe influent area, soil near upgradient drainage feature, or contaminated soil along preferential contaminant migration pathways such as a pipe bed, etc. Importantly, these soil data tables (pp. 16-24) do not contain EPH data and this report completely lacks information regarding petroleum product use on-site (purpose, location, duration, product transfers/handling, transport), or any information on product soil residuals, spills, discharges, or whether there were any product-related soil remediations (see comment 5).

The Department notes that on the table of on-site soil data within 200'of the Arthur Kill (p.24), soil contains extraordinarily high average and maximum concentrations of Lead at 16,000 mg/kg (530X ESC) and 750,000 mg/kg (70%; 24,000X ESC), respectively. Additionally, the maximum concentration of total PAHs is approximately 3000 mg/kg (750X the ESC) and the maximum concentration of Copper is approximately 4000 mg/kg (250 X ESC). Data from the five (5) Arthur Kill sample are available from only the 0-0.5' interval, therefore sediment samples not were collected in accordance with the EETG section 5.3.3, which recommends a minimum two intervals to fully evaluate linkage to the site.

5. General comment - This report does include a comprehensive evaluation of contaminant migration pathways from source areas to the three water bodies, as required pursuant to N.J.A.C.7:26E-1.16, 3.6 and 4.8 and in accordance with the EETG, USEPA 1997, and the administrative guidance "Investigating Impacts from Contaminated Sites to a Surface Water Body," November 2015. The EE must consolidate existing information from all former "yards" into an ecological conceptual site model for the site and comprehensively describe current and historic contaminant migration from the site to the three surface water bodies via all routes. Consideration should be given to the management of process waste/wastewater, storm water, and direct discharges (e.g., from spills, fuel transfers, tanker operations) for the entire site throughout its complete operating history. Notwithstanding that certain "pipe trenches" and "pipeways" are labeled on Figures 3-5, Chevron must ensure that all drainage systems features (e.g., ditches, channels) and outfalls have been identified and sampled to establish gradients and linkages of site contaminants to those identified in Woodbridge Creek, Spa Spring Creek, and the Arthur Kill. For example, ETRA had reviewed an April 2001 BEE for the 26-acre West Yard. It described that bunker fuel and No. 6 fuel oil were stored in above ground storage tanks, and that a system of storm sewers, catch basins, and two ditches conducted surface runoff to Spa Spring Creek. The report identifies Copper, Lead, Nickel, and Zinc as contaminants of potential ecological concern. Chevron is responsible to ensure that a similar assessment is reported for the entire site/all "yards" and that appropriate data have been collected in all site contaminant migration pathways and outfalls in water bodies. Chevron also needs to address discharges from the North Field Basins and ground water.

6. General comment - It is apparent that the former Chevron site has contributed free and/or residual product and other contaminants to the Woodbridge Creek, however, the requisite ecological conceptual site model and evaluation of contaminant migrations pathways, needed to determine linkages between contaminants on-site and in surrounding surface water bodies, must be completed (see comment 5). For the Remedial Investigation (RI) to be complete, horizontal and vertical delineation of product and other site-related contaminants (e.g., metals and PAHs) in contaminant migration pathways and ESNRs is required pursuant to N.J.A.C 7:26E-1.16, 3.6, and 4.8. Remediation of free and/or residual product is required, pursuant to N.J.A.C 7:26E- 5.1 (e). As per N.J.A.C.7:26E-4.8, contaminants remaining outside of the remediation footprint for product can either be remediated to the ESC or background concentrations (see comment 3 regarding background levels), or an ecological risk assessment in accordance with USEPA,1997 and the EETG can be conducted to develop site-specific ecological risk-based sediment remediation goals. Pursuant to N.J.A.C. 4.9(a)6.ii. (2), Chevron must determine whether a remedial action is planned or required.

7. (p. 28) 5.0 *Conclusions* - the conclusion in the second bullet states that "Pathways for contaminant migration from SWMUs and AOCs to environmentally sensitive natural resources do not appear complete." This report contains no data or documentation of any kind to support this conclusion, and in fact, the information from the 2001 BEE counters this statement.

Path Forward

The *Supplemental Ecological Evaluation Report* must be revised pursuant to the above comments. Again, pursuant to N.J.A.C. 4.9(a)6.ii.(2) Chevron must determine whether a remedial action is planned or required. Because this is a RCRA 2020 site with technical lead delegated to the Department, Chevron is responsible to ensure that USEPA,1997 is followed.

References

NJDEP. August 9, 2010. *NJDEP Protocol for Addressing Extractable Petroleum Hydrocarbons, Version 5.0Appendix 2 "Residual Saturation Values for No. 2 Fuel Oil, Diesel, and Heavier TPH Products"*

USEPA. June, 1997. *Ecological Risk Assessment Guidance For Superfund, process for designing and conducting ecological risk assessments.* EPA 540-R-97-006. Office of Solid Waste and Emergency Response. Washington, DC.

If you have any questions, please contact me at 609-292-3007.

Sincerely,

Anne Pavelka

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